REMARKS

I. CLAIMS

Claims 1-14 are pending. Claim 1 has been amended and new claim 14 has been added.

Claim 1 has been amended by incorporating the language that "the photosensitive resin composition is capable of crosslink-curing by irradiation thereof with a light or an electron beam". Support for this amendment is found at page 66, lines 13-17 of the present specification.

Further, new claim 14 is directed to the photosensitive resin composition further comprising a photopolymerization initiator. Support for new claim 14 is found at page 66, lines 17-20 of the present specification.

Accordingly, no new matter has been introduced.

II. FIRST REJECTION UNDER 35 U.S.C. § 103

Claims 1-5 and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takemiya et al., U.S. Patent No. 6,372,351 B1 in view of Kakishita et al., U.S. Patent No. 6,387,594 B1 and further in view of Mori et al., U.S. Patent No. 6,399,270 B1 for the reasons noted on pages 2-5 of the Office Action. Specifically, the Office Action asserts/contends:

> Takemiya teaches a resin composition comprising an epoxy resin, a non-conductive carbon and an inorganic filler (col. 2, lines 44-47). The resin composition is photosensitive because the composition is exposed to laser light (see column 14, lines 65-67). The epoxy resin, acrylic resins and fluorine resins meets the limitations of thermoplastic and solvent-soluble resins. Table 1, example 1 discloses the epoxy resins in an amount of 100 parts by weight and an arylalkyl phenolic resin in an amount of 87 parts by weight in the composition. The composition further comprises a coupling agent (organic compound) such as vinylethoxysilane and meets the limitations of a polymerizable unsaturated group per molecule. The inorganic filler may comprise powders of fused silica, alumina and zirconia. The inorganic filler may also comprise a spherical particle shape (col. 9, lines 15-28). The composition may comprise a non-conductive carbon material (carbon black covered with an insulating, inorganic material such as silica) and having an average particle diameter of 0.3 to 5 μm (col. 8, line 59), surface area of 130 m^2/g or smaller, and a DBP oil absorption of 120 $cm^3/100$ g (120 ml/100 g) or less (col. 10, lines 34-40). Since the non-conductive carbon material has an average particle diameter of 0.3 to 5 μm, it also would have a pore volume of 0.1 ml/g to 10 ml/g. Takemiya teaches that there are

no limitations on the carbon black used in the carbon-included filler. Therefore the inorganic porous material is exemplified in the carbon-included filler obtained by covering particle surface of carbon black with insulating inorganic matter, such as silica (see col. 7, lines 30-35). Takemiya does not teach the process of forming a relief printing element with the resin composition.

However, Kakishita teaches a plate making film comprising a substrate, a hydrophilic, transparent film layer and a polymeric layer. The transparent film layer (elastomeric layer) comprises a photosensitive polyurethane resin. The polyurethane resin is in a liquid state at room temperature, subsequently becoming a plastic film after heating (col. 11, lines 45-60). The resin is coated onto a transparent plastic substrate, which is representative of a sheet composition. The resin is then irradiated to crosslink the polymeric compound in the resin, which is representative of photocuring as in instant claim 9 (col. 6, lines 17-22 and 61-65). The composition also comprises a polymeric compound with a molecular weight of 150,000 (col. 11, line 54).... The resin composition was exposed, washed with water and exposed again. This process removes selected areas of the resin that are not used to form a letterpress. The composition has a Shore hardness of 60 degrees (col. 12, lines 25-45). The laser exposure is a form of heating and therefore meets the limitations of instant claim 13. It would have been obvious to one of ordinary skill in the art to combine the product of Takemiya with the process of Kakishita because Kakishita teaches the plate making process comprising a photosensitive resin composition with the same components as Takemiya. Takemiya nor Kakishita teaches the molecular weight of an organic compound of less than 5,000.

However, Mori teaches a printing plate comprising a component layer with inorganic porous particles (col. 6, lines 34-43). The component layer also comprises a plastic resin and an organic compound (col. 43, line 39). The plastic resin may comprise thermally fusible materials, such as novolac and acryl resins that have a softening point of 50 to 200 °C (col. 13, line 54 and col. 14, line 15). The plastic resins in the printing plate may further comprise a solvent-soluble resin, such as a polyimide resin (col. 11, line 57). The organic compound has a molecular weight of 400 to 1,000 and is present in an amount of 5 to 70 % of the photosensitive layer, therefore is present at least in an amount equivalent to 5 to 200 parts by weight of the resin (col. 44, line 51-56). The organic compound also meets the limitations of instant claim 4. The printing plate is exposed to infrared laser and developed (col. 48, lines 23-36). Therefore, a relief printing element is formed. It would have been obvious to one of ordinary skill in the art to add an organic compound with the molecular weight of 400 to 1,000 to the photosensitive composition of Mori because Mori teaches a photosensitive composition with the same components in the same parts by weight, therefore the organic compound would have a molecular weight in the claimed range.

However, Applicants respectfully disagree with such assertions/contentions and traverse this rejection for the reasons noted in detail below. At least the following assertions/contentions in the Office Action are incorrect:

that Takemiya et al. teach the photosensitive resin composition of the claimed invention;

that Kakishita et al. teach the plate making process of the claimed invention and, therefore, it would have been obvious for a skilled person to combine the product of Takemiya et al. with the process of Kakishita et al. to obtain the laser engravable printing element of the present invention; and

that Mori et al. teach not only a printing plate comprising a component layer which contains all of resin (a), organic compound (b) and inorganic porous material (c) of the claimed invention, but also the use of an organic compound having a molecular weight of 400 to 1,000 and, therefore, it would have been obvious for a skilled person to use the organic compound described in Mori et al. for producing a photosensitive resin composition.

The above-noted assertions/contentions are incorrect as explained in further detail below. Thus, the claimed invention is not obvious over Takemiya et al. in view of Kakishita et al. and further in view of Mori et al.

(1) Takemiya et al.

The Examiner misunderstands that the resin composition disclosed in Takemiya et al. is a photosensitive resin because it is exposed to light. As clearly defined in amended claim 1 of the present application, the photosensitive resin composition of the claimed invention is a resin composition which is capable of crosslink-curing by irradiation thereof with a light or an electron beam. In other words, the photosensitive resin composition of the claimed invention is a photocurable resin composition.

The resin composition of Takemiya et al. is not a photocurable resin composition. Specifically, in the working examples of Takemiya et al., a semiconductor device for evaluation was produced by transfer molding of a test device using the encapsulant epoxy resin composition (see col.14, lines 32-42 of Takemiya et al.), wherein the transfer molding was carried out under conditions wherein the heat curing of the molded resin composition was performed at 180 °C for 90 seconds, followed by post-curing at 175 °C (see col. 13, lines 60-67 of Takemiya et al.) The thus obtained resin-encapsulated semiconductor device was subjected to laser markability evaluation, wherein letters were printed on the surface of the package (made

of heat cured encapsulant epoxy resin composition) by means of a YAG laser marking device (see column 13, line 64 to column 14, line 5 of Takemiya et al.)

As apparent from the above, in Takemiya et al., the epoxy resin composition is cured by heating and only a cured resin composition is exposed to light for marking letters on the cured resin composition. Therefore, Takemiya et al. have no teaching or suggestion about a photosensitive resin composition which is crosslink-cured by irradiation thereof with a light or an electron beam.

Further, the Examiner misunderstands that the non-conductive carbon material described in Takemiya et al., which is formed by covering carbon black particles with an inorganic porous material, is the same as the inorganic porous material (c) used in the present invention because Takemiya et al. teach carbon black particles which satisfy the DBP oil absorption and specific surface area limitations defined in the claimed invention.

It should be noted that, in Takemiya et al., the specific surface area and the DBP oil absorption value are only defined for carbon black used as conductive particles (see col.10, lines 34-41 of Takemiya et al.) There is no sound reasoning to contend that a non-conductive carbon material formed by covering conductive carbon black particles with an inorganic porous material have the same specific surface area and exhibits the same DBP oil absorption value as those of the raw material conductive carbon black particles. Carbon black particles have large specific surface area and high DBP oil absorption value because they are very fine microparticles. When carbon black particles are coated with an inorganic material (such as silica), it can be easily understood that the resultant coated carbon black particles have a particle diameter and surface properties which are different from those of the carbon black particles before coating with the inorganic material. Accordingly, there is no sound reasoning to contend that Takemiya et al. describe an inorganic porous material which is the same as the inorganic porous material (c) used in the claimed invention.

From the above, it is apparent that the photosensitive resin composition of the claimed invention which comprises resin (a), organic compound (b) and inorganic porous material (c) and which is capable of crosslink-curing by irradiation thereof with a light or an electron beam is not obvious over Takemiya et al. which have no teaching or suggestion about a photocurable resin composition.

(2) Kakishita et al.

The Examiner misunderstands that a process of forming a relief pattern described in Kakishita et al. is the same as the laser engraving method used in the claimed invention. As explained in detail below, the process described in Kakishita et al. is a photolithographic method which is completely different from the laser engraving method used in the claimed invention.

In Kakishita et al., a printing plate is produced as follows. A plate making film bearing a pattern formed with an ink having UV shielding properties is used as a photomask, and the plate making film is placed on a photosensitive member. Subsequently, the resultant masked photosensitive member is exposed to UV radiation to thereby crosslink the exposed portions of the photosensitive member. After stripping off the plate making film from the photosensitive member, the resultant exposed photosensitive member is subjected to a developing treatment by a developing device for washing away the unexposed portions of the photosensitive member (i.e., uncrosslinked photosensitive member) (see col.11, line 66 to col.12, line 23 and Example 1 of Kakishita et al.)

In this method, relief pattern is formed by irradiating a masked photosensitive member to photocure only the exposed portions (corresponding to the convex portions of the relief pattern) of the photosensitive member, and washing away the non-exposed (i.e., uncured) portions (corresponding to concave portions of the relief pattern) of the photosensitive member by the developing treatment. This method is completely different from the laser engraving method used in the claimed invention. In laser engraving method, the whole of a photosensitive resin composition layer formed on a support is photocured by light or electron bean irradiation, and preselected portions (corresponding to convex portions of a relief pattern) of the cured resin composition layer is irradiated with a laser beam to ablate and remove the irradiated portion of said cured resin composition layer, thereby obtaining a laser engraved printing element having a relief pattern formed thereon (see page 87, line 7 to page 88, line 7 of the present specification). In this method, convex and concave portions of the relief pattern are produced at once by laser engraving and, therefore, there is no need to prepare a photomask. Further, the developing treatment for removing the uncured portions of the photosensitive member is not necessary. As apparent from the above, Kakishita et al. have no teaching or suggestion about the laser engraving method used in the claimed invention. Notably, Kakishita et at. discusses photocuring with UV which is different from using "a laser beam to ablate" as recited in claims 12-13.

The Office Action asserts that it would have been obvious for a skilled person to combine the product of Takemiya et al. with the process of Kakishita et al. to obtain the laser engravable printing element of the claimed invention. This understanding is incorrect because the resin

composition of Takemiya et al. which is not a photosensitive resin composition cannot be used for forming a flexographic printing plate by the method described in Kakishita et al. In the method of Kakishita et al., a resin composition is irradiated with light through an image-bearing photomask to crosslink-cure only the exposed portions of the resin composition, thereby forming convex portions of the flexographic printing plate and, then, the unexposed portions of the resin composition are removed by developing treatment to thereby form concave portions of the flexographic printing plate. Since the resin composition of Takemiya et al. is not a photosensitive (photocurable) resin composition, it is impossible to photocure only the desired portions of the resin composition for forming a relief pattern.

(3) **Mori et al.**

The Examiner misunderstands that Mori et al. teach not only a printing plate comprising a component layer which contains all of resin (a), organic compound (b) and inorganic porous material (c), but also the use of an organic compound having a molecular weight of 400 to 1,000. Although Mori et al. teach the use of an inorganic porous particles and an organic compound, Mori et al. have no teaching or suggestion about a photosensitive resin composition which simultaneously contains resin (a), organic compound (b) and inorganic porous material (c) of the claimed invention.

When the printing plate of Mori et al. comprises a photosensitive image recording layer, the printing plate is a laminate comprising a substrate, a hydrophilic component layer and a photosensitive layer (see col.22, lines 61-67 of Mori et al.) The inorganic porous particles are contained in the component layer which is provided between the substrate and the image recording layer (see claim 1 of Mori et al.), and the organic compound having a molecular weight of 400 to 1,000 (i.e., an acid decomposing compound) is contained in the photosensitive layer (see col.39, lines 54-57 of Mori et al.) Accordingly, inorganic porous material and organic compound are contained in different layers of a laminate. Therefore, Mori et al. have no teaching or suggestion about a resin composition simultaneously containing all of resin (a), organic compound (b) and inorganic porous material (c).

The Office Action asserts/contends that it would have been obvious for a skilled person to combine the teachings of Mori et al. with the product of Takemiya to obtain the photosensitive resin composition of the claimed invention. This understanding is incorrect because Mori et al. have no teaching or suggestion about a photosensitive resin composition which simultaneously contains resin (a), organic compound (b) and inorganic porous material (c). Therefore, there is

no sound reasoning to contend that a skilled person would have used the organic compound (i.e., an acid decomposing compound) described in Mori et al. with the resin composition of Takemiya et al. Even when the organic compound (i.e., an acid decomposing compound) described in Mori et al. is used in combination with the resin composition of Takemiya et al. which is not a photosensitive (photocurable) resin composition, the resultant resin composition is not a photosensitive resin composition of the claimed invention which is capable of crosslink-curing by irradiation thereof with a light or an electron beam.

As apparent from the above, the photosensitive resin composition of the claimed invention is not obvious over Takemiya et al. in view of Kakishita et al. and further in view of Mori et al.

Now that the patentability of independent claim 1 over the cited references has been established, the Applicants believe that the patentability of all of dependent claims 2 to 14 has also been established.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-5 and 8-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Takemiya et al., in view of Kakishita et al., and further in view of Mori et al.

II. SECOND REJECTION UNDER 35 U.S.C. § 103

Claims 1, 2, 5, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takemiya et al., (above) in view of Kakishita (above) and Mori (above) as applied to claim 1 above, in view of Watanabe et al., U.S. Patent Publication No. 2002/0045126 A1 and further in view of Mohri et al., U.S. Patent No. 5,851,649 for the reasons noted at pages 6-7 of the Office Action.[1] More specifically, the Office Action asserts/contends:

> Takemiya teaches an epoxy resin composition comprising an epoxy resin, a non-conductive carbon and an inorganic filler (col. 2, lines 44-47). Takemiya does not teach the sphericity of the silica particles or polyhedral particles as in instant claim 6.
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> However, Watanabe teaches a photocurable composition comprising spherical silica particles. The spherical silica particles have a sphericity of 0.95 or more (page 5, [0056]). Watanabe also teaches the spherical silica particles may also comprise an average particle

[1] Note: In the outstanding Office Action, there is a misunderstanding in that the Applicants of U.S. Patent No. 5,851,649 are incorrectly asserted to be "Mohr et al." when the correct Applicants of U.S. Patent No. 5,851,649 are "Mohri et al."

> diameter of 1-50 μm. Therefore, it would have been obvious to one of ordinary skill in the art to use particles having a sphericity amount as claimed because Watanabe shows the sphericity amounts as conventional in photosensitive resins. Watanabe does not teach polyhedral particles.
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> However, Mohr[i] teaches inorganic porous particles, such as polyhedral crystals with a pore size distribution of smallest (10 %) to largest (90 %) sphere in the polyhedral particle (D_{10}/D_{90}) is no more than 3 (abstract). According to figure 3 in the Mohr reference, the pore volume distribution is at 100 % when the pore diameter of the particle is approximately 5-10 nm (0.005-0.010 μm). Therefore, it would have been obvious to one of ordinary skill in the art that the polyhedral particles having a D_{10}/D_{90} ratio of 3 would be expected to have a D_3/D_4 ratio of 1 to 3 because the values are based on pore volume distribution and diameter.

However, Applicants respectfully disagree with such assertions/contentions and respectfully traverse this rejection for the reasons noted below. As explained in detail above, the claimed invention is not obvious over Takemiya et al. in view of Kakishita et al. and further in view of Mori et al. which have no teaching or suggestion about the photosensitive resin composition of the claimed invention which comprises resin (a), organic compound (b) and inorganic porous material (c) and which is capable of crosslink-curing by irradiation thereof with a light or an electron beam, as recited in the rejected claims.

Patentability of the claimed invention over Takemiya et al. in view of Watanabe et al. and Mohri et al. is further explained below.

(1) Watanabe et al.

The Office Action asserts/contends that the spherical silica particles described in Watanabe et al. are porous particles.[2] However, Watanabe et al. have no adequate description about the pore diameter or porosity of the spherical particles used and, thus, there is no sound reasoning for the contention that Watanabe et al. describe the pore diameter. For example, Watanabe et al. discusses "particle diameter" of 1-50μm (*i.e.*, 1,000nm – 50,000nm). However, the "particle diameter" is different from the "pore diameter" (of the inorganic porous material) in the range of 1-1,000nm as recited in claim 1.

Further, even when the spherical particles described in Watanabe et al. are used in combination with the resin composition of Takemiya et al. which is not a photosensitive (photocurable) resin composition, the resultant resin composition is not a photosensitive resin

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[2] Also, the assertion that the particles may be/are porous does not indicate the size of the pores themselves.

composition of the claimed invention which is capable of crosslink-curing by irradiation thereof with a light or an electron beam.

As apparent from the above, Kakishita et al. in view of Watanabe et al. have no teaching or suggestion about a resin composition comprising resin (a), organic compound (b) and inorganic porous material (c) of the claimed invention which is capable of crosslink-curing by irradiation thereof with a light or an electron beam.

(2) Mohri et al.

The Examiner misunderstands that the polyhedral porous particles are described in Mohri et al. As explained in detail below, Mohri et al. have no teaching or suggestion about the use of inorganic porous particles.

In item 28 of the outstanding Office action, it is stated that "according to figure 3 of Mohr the pore volume distribution is not referring to void space, but the size distribution of the inorganic particles". This understanding is incorrect. According to the "Brief Explanation of the Drawings" of Mohri et al., Figure 3 is "a graph illustrating a cumulative pore volume distribution curve of the porous sintered body obtained in Example 5" (see col.2, lines 4-6 of Mohri et al.) In Example 5 of Mohri et al., a porous sintered body was produced by molding and calcining a polyhedral α-alumina powder and, then, the produced porous sintered body was evaluated. A cumulative pore volume distribution curve of the resulting porous sintered body was shown in FIG. 3 of Mohri et al. (see col.6, lines 50-63 of Mohri et al.) Therefore, Mohri et al. have no teaching or suggestion about porous inorganic particles and only describe the pore volume distribution of the sintered body, namely the distribution of the voids between the particles.

To emphasize that point, it is noted that Mohri et al. provides in Fig. 3 thereof a **distribution** of pore volume (i.e., "CUMULATIVE PORE VOLUME DISTRIBUTION/%") versus **pore diameter** (in **μm** units), which **distribution** of pore volume is not the same as the pore volume itself. In other words, a 100% **distribution** of pore volume would mean that the pores are distributed throughout, but that is not an indication (from Fig. 3 of Mohri et al.) of the actual pore volume itself. Thus, the pore volume itself is not correlated to a particular pore diameter pursuant to Fig. 3 (of Mohri et al.).

Further, even when the polyhedral particles described in Mohri et al. are used in combination with the resin composition of Takemiya et al. which is not a photosensitive (photocurable) resin composition, the resultant resin composition is not a photosensitive resin

composition of the claimed invention which is capable of crosslink-curing by irradiation thereof with a light or an electron beam.

As apparent from the above, Kakishita et al. in view of Mohri et al. have no teaching or suggestion about a resin composition comprising resin (a), organic compound (b) and inorganic porous material (c) of the claimed invention which is capable of crosslink-curing by irradiation thereof with a light or an electron beam.

From the forgoing, Applicant's respectfully submit that the rejection of claims 1, 2, 5, 6 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Takemiya et al., in view of Kakishita et al., and further in view of Mori et al., as applied to claim 1 above, in view of Watanabe et al., and further in view of Mohri et al. has been overcome.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 5, 6 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Takemiya et al., in view of Kakishita et al., and further in view of Mori et al., as applied to claim 1 above, in view of Watanabe et al., and further in view of Mohri et al.

VI. CONCLUSION

In view of the above, Applicants respectfully submit that this application is in condition for allowance and respectfully request an early favorable indication culminating in a Notice of Allowance, which is earnestly solicited.

If any issues remain outstanding, the Examiner is respectfully requested to contact the undersigned attorney so that any remaining issues may be promptly resolved.

No fees are believed to be due for the filing of this paper. However, if any additional fees are due or any overpayment of fees has been made, please debit or credit our Deposit Account No. 19-3935, as necessary.

Respectfully submitted,
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Date: 1 March 2007

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